XMM Optical Monitor

U. C. SANTA BARBARA– LOS ALAMOS & SANDIA NATIONAL LABORATORIES

Authors: J. Kennea, C. Ho, T. Sasseen

DPU FLIGHT SOFTWARE TEST REPORTS FOR RELEASE 11

DOCUMENT: XMM-OM/UCSB/RP/0007

Signatures:

Author:	Date: August 18, 2000
OM Project Office	Date:
Distributed:	Date:

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Section 1: Scope of Document

This document contains the test reports for software modifications for Release 10b of the DPU flight software, a delta release, released in June 2000 to fix a problem with field acquisition in Release 10. The software modifications themselves are described in document XMMOM/UCSB/TC/0051. A complete description of the DPU testing philosophy and setup is given in XMMOM/UCSB/RP/0002.

Section 2: NCR Test Reports

2.1 Test report for NCR 171

Problem

It was decided to reverse the decision of NCR 171 and revert to the ENG4 16 chunk downlink mode

Action

Change the value of ENG4_OUTPUT in white_control.h from 2 to 0.

Test

1. Recompile and reload the DPU flight codes.
2. Execute eng4 exposure script.
3. Examine data output to confirm 16 chunks and data reasonableness.
4. Behavior confirmed both on EOB2/SNLA and QM/MSSL.

Results

The ENG4 is now downlinked in 16 chunks instead of 1

Affected codes

```
white_control.h v
```

2.2 Test report for NCR 202

Problem

Missing alerts during clean slate.

Action

DPU code change.

Test

1. Recompile and reload the DPU flight codes.
2. Execute eng4 exposure script.
3. Examine data output to confirm 16 chunks and data reasonableness.
4. Behavior confirmed both on EOB2/SNLA and QM/MSSL.

Results

Seen to work on QM tested at MSSL by Phil Smith 11.08.2000

Affected codes

```
cwhite.c v1.49
su_initialize.c v1.42
```

2.3 Test report for NCR 203

Problem

Field acquisition was failing due to the DPU expecting the incorrect word ordering of the encoded reference star positions in the IC_LOAD_REF_STARS (A428) command. This caused the positions to be corrupted, as seen in the DP_REF (A202) priority data packet which echoes back the uploaded reference star positions.

Action

The DPU code was fixed to correctly read in the reference star positions from the IC_LOAD_REF_STARS command.

Test

Corrected the EGSE part of the QM to upload the correct IC_LOAD_REF_STARS command. Ran a simulation with known reference star positions, comparing the IC_LOAD_REF_STARS command with the echoed reference star positions in the DP_REF.

Results

The positions of the reference stars were correctly echoed in the DP_REF data packet, in the correct format.

Affected codes

`cwhite.c v.1.50`

2.4 Test report for NCR 205

Problem

During the choose guide star algorithm, illegal memory access alerts were being seen for the case when the magnifer was being used. This was due to the NOMINAL_X_DIM and NOMINAL_Y_DIM being set to "26" for the magnifier, which is larger than the tracking guide star window.

Action

NOMINAL_X_DIM and NOMINAL_Y_DIM were both set to 24 for magnifier tracking.

Test

A series of test exposures were executed that consisted of taking a reference frame and executing the Choose guide star task only, in order to test CGS as many times as possible.

Results

With release 10b of the code this test gives consistent memory access alerts after the first exposure has been taken. After the above action was implemented these alerts were no longer seen using this exposure test.

Affected codes

```
su_scangs.c v1.29
white_default.h v1.25
```

2.5 Test report for NCR 208

Problem

The fast mode accumulation buffer pointer was not being correctly initialised, leading to a possible corruption of fast mode data.

Action

The fast mode buffer pointer toggling was changed to be independent from accumulation pointer.

Test

Combination of fast mode and non-fast mode tests were ran at Sandia by Cheng Ho.

Result

Fast mode tests saw no fast mode corruption.

Affected codes

`whitedsp.c: v1.72`

2.6 Test report for NCR 209

Problem

If tracking failed due to CGS not finding any good guide stars, the calculated shift and add offsets (usually from the previous exposure) are not reset and the Red DSP applies these shifts to all frames for the observation. Occasionally when tracking fails badly these offsets can be large and cause data loss.

Action

In the case where CGS fails the offsets are now set to zero in the whitedsp.c code.

Test

Multiple RUDI-5 exposures were performed.

Results

No problems found.

Affected codes

```
su_scangs.c v1.29
white_default.h v1.25
```

2.7 Test report for ECR 90

Problem

ECR90 requires the addition of DA_BEGOF_EXP and DA_ENDOF_EXP alerts at the beginning and end of engineering mode exposures.

Action

These alerts were added into the relevant part of the DPU code.

Test

Engineering mode exposure scripts were run on the QM.

Result

Seen to work on QM tested at MSSL pjs1 11.08.2000

Affected codes

```
whitedsp.c v1.71
su_engineering.c v1.12
```

2.8 Test report for ECR 91

Problem

Rudi-5 imaging is not efficient at observing due to only the central hi-res window being observed in all 5 exposures. This results in the rest of the FOV only being observed for 20% of the time.

Action

A new mode of observation was programmed, where the entire field of view is imaged with BPE binning on to obtain a resultant 1024x1024 image with 1" pixels (binned 2x2).

Test

Tests of the new mode were made.

Results

The tests were successful.

Affected codes

```
whitedsp.c v1.73
cwhite.c v1.51
white_control.h v1.19
```

Appendix 1: List of Acronyms

CPU	Central Processor Unit
CVS	Concurrent Version System
CH	Cheng Ho
DEM	Digital Electronics Module (made up of DPU and ICU)
DPU	Digital Processing Unit (supplied by US)
ECR	Engineering Change Request
EOB	Electro-Optical Breadboard
ICU	Instrument Control Unit (supplied by MSSL)
LANL	Los Alamos National Laboratory
MSSL	Mullard Space Sciences Laboratory
NCR	Non-Conformance Report
SNL	Sandia National Laboratory
UCSB	University of California at Santa Barbara